COMPARATIVE CLIMATOLOGY

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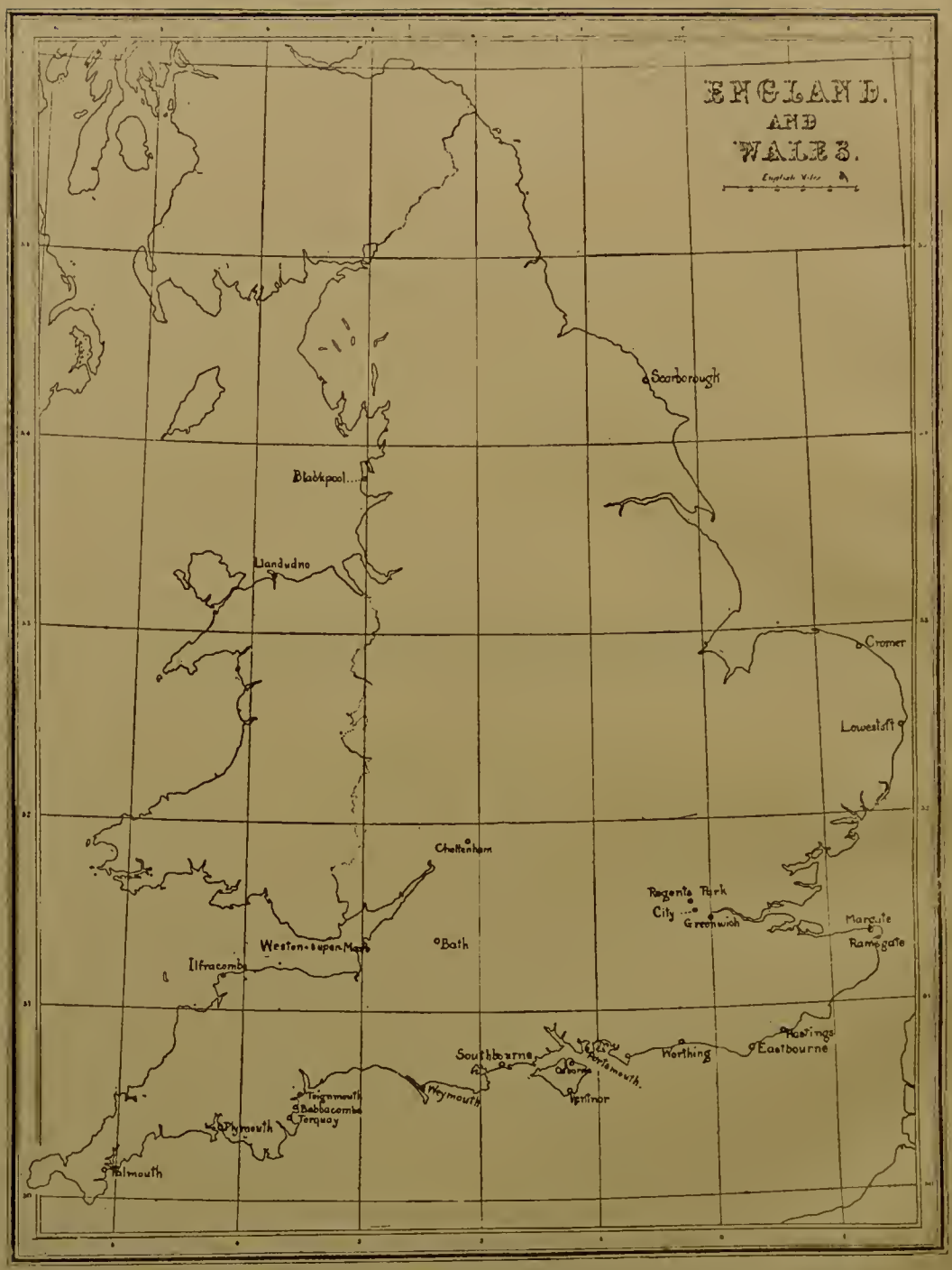

A Map indicating the position of the Meteorological Stations referred to in the Tables of Statistics.

THE COMPARATIVE

CLIMATOLOGY OF LONDON

AND THE

CHIEF ENGLISH HEALTH RESORTS

BY

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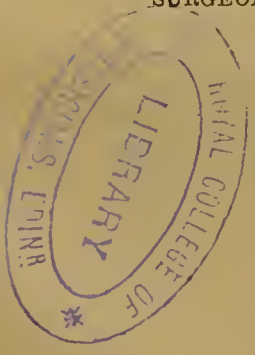
SURGEON TO THE ROYAL SEA BATHING INFIRMARY FOR SCROFULA, MARGATE.



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NOTE.

In a Leading Article that appeared in the *Lancet*, of September 27th, on this paper, the writer called attention to the omission of statistics referring to the number of rainy days at the various stations; in this re-print I have added them to the table dealing with the rainfall. I have also again gone through the figures, so as to ensure perfect accuracy.

I may add that the figures forming the basis of my calculations, are all taken from the Reports of the Royal Metcorological Society, and these reports are of course not open to question.

The geological details were kindly sent to me by the Mcdical Officcrs of Health in the various districts.

I would express a hope that the statistics set forth in this short paper, may help to place the subject of the climate of our health resorts on a more scientific and reliable basis, even if it compels us to uproot many old and well-cherished ideas, and to realise the fact that in this small island the variations of climate are after all not quite as great as most of us have been accustomed to imagine.

Margate, January, 1891.

THE COMPARATIVE CLIMATOLOGY OF LONDON AND THE CHIEF ENGLISH HEALTH RESORTS.*

In the earlier part of this year a discussion arose in the medical press on the subject of the climate at certain health resorts. It occurred to me that it would be interesting to gather together and compare the meteorological statistics of the metropolis and a *large and representative number* of the chief health and pleasure resorts: not with the view of attempting to prove that there existed some special paradise of pleasure and health, but to place a simple record before the profession of uncomplicated statistics, which each member might easily analyse for himself. From time to time articles have appeared to show, by a vast array of figures, that some favoured locality possessed climatic advantages surpassing all its neighbours. In many instances these figures were found to be based on observations taken at irregular intervals, and under comparatively widely differing conditions; the recording instruments were not always similar,

* Reprinted from the "Lancet" of September 20th, 1890.

and their position as regards surrounding objects was not always alike. The battle of figures consequently went on merrily between one place and all the others, as it is perhaps likely to do till the end of time. In this article, at any rate, an effort has been made to secure uniformity of instruments and methods of calculation. The averages have been carefully calculated from the results of at least half a million observations in different parts of the kingdom, all these observations conforming to the strict and minute regulations of the Royal Meteorological Society, whose inspectors periodically visit and report upon the accuracy of the instruments at the different stations, and whose officials carefully analyse and tabulate all the facts recorded by the indefatigable army of observers. A writer who has the temerity to attempt to deal with a huge mass of statistics is likely to start a friendly combatant in every reader, for no two men can ever thoroughly agree on the interpretation of statistics. No wise man will attempt to *prove* anything by long and complicated lists of figures, perhaps he may even be considered rash to *suggest* deductions that may be drawn from them. In the words of an old German Volkslied—

> Wir stolze Menschenkinder
> Sind eitle arme Sünder,
> Und wissen gar nicht viel.
> Wir spinnen Luftgespinnste,
> Und suchen viele Kunste,
> Und kommen weiter von dem Ziel!

Before entering upon the study of the climatology of England, it is a good plan, in order to bring one's mind into a suitably humble condition, to

open the atlas at the map of the world on Mercator's projection; it will at once appear to the student that England is the half of a very small island; and that our little storms of wind and rain are, after all, but storms in a teapot, mere eddies on the face of the great world. This is perhaps a platitude, but I venture to think it is the keystone of the present article. Medical men and the lay public (apart, perhaps, from professional meteorologists) cannot fail to be struck with the comparatively minute variations between the weather statistics of one town and another. After our ears have been dinned by the strife of factions proclaiming that some small spot on our south coast is a Monte Carlo in winter, and that its next door neighbour is a romping place for all the winds from Russia, it may come as a surprise to many that one or two degrees of temperature will cover the difference between some of our reputed warmest and reputed coldest winter resorts. Far be it from me to suggest that temperature is the only criterion of a winter resort. The prevailing winds, the daily range of temperature, the rainfall, the relative humidity, the subsoil, the vegetation, the absence of cloud, and last, but not least, the aspect of the locality and the degree of protection by hills, &c.—these all are important considerations. Perhaps the most important factor of all, and the one that influences most doctors and patients, is the social or fashionable reputation a place bears; and it is perhaps natural that this should be so, for the people who can afford to

leave home for their health's sake are the wellborn and wealthy, who, like other men, are gregarious, and prefer to herd with their kind. There are, however, a large number of sick people whose sole business and anxiety is to regain health, who do not necessarily long for the sight of crowds of fashionably dressed people. Consequently, besides mere climatic advantages, the medical adviser has to consider many other equally important matters if his patient is to be benefited. In the month of August delicate and sensitive patients are likely to fare badly as regard comfort and quiet at such haunts of the London Cockneys as Brighton, Eastbourne, Margate, Ramsgate, &c., unless they have previously become comfortably settled in some of the quieter quarters of these towns.

Before entering on the subject of figures, I should like to acknowledge the cordial and invaluable assistance I have received from Mr. John Stokes, F.R.Met.S., of Apsley House School, Margate, who has devoted much labour for many years to this subject. The figures are in nearly all instances calculated on regular daily records at all the stations for seven years—viz., 1882-1888. The figures for 1889 for some of the places were not to hand at the time of compiling this paper. A fairer estimate of the climate can be gathered by dividing the year into summer and winter in some cases; the months of May to October inclusive are considered as summer months and November to April inclusive are reckoned as winter. The colder months will probably be regarded with more interest, so I have

given them greater prominence. I may here add that *all* the health resorts having stations under the reliable auspices of the Meteorological Society have been included in the various lists, if their records have covered with regularity a sufficient number of years.

TABLE I.—*Average winter and summer temperature at 33 stations for the years 1882-88 inclusive.*

Name of Station.	Winter.	Summer.
Guernsey	45·5°	57·6°
Falmouth	44·9	56·4
Ilfracombe	44·9 (*44·6°*)	57·0
Ventnor	44·2	57·7
Teignmouth	43·8	57·0
Weymouth	43·5	56·8
Torquay	43·5 (*43·3°*)	55·9
Babbacombe	43·4	56·1
Plymouth	43·4	56·2
Weston-super-Mare	43·0	56·6
Llandudno	42·7 (*42·5°*)	55.2
Portsmouth	42·7	55·2
Southbourne (near Bournemouth)	42·5 (*42·7°*)	56·0
Old Street (London)	42·4	58·1*
Eastbourne	42·2 (*42·2°*)	56·2
Worthing	42·2	56·6
Hastings	42·2 (*42·6°*)	57·0
Margate	41·8 (*42·3°*)	56·4
Osborne	41·8 (*42·1°*)	56·2
Regent's Park	41·6	56·9
Ramsgate	41·6 (*42·3°*)	56·7
Camden-square	41·5	56·4
Norwood	41·5	56·8
Southampton	41·4	55·8
Greenwich	41·2	56·9
Kew	41·2	56·6
Blackpool	40·8 (*41·2°*)	53·9
Lowestoft	40·8	54·8
Scarborough	40·8 (*41·3°*)	54·1
Blackheath	40·7	55·9
Cromer	40·6 (*40·9°*)	55·4
Cheltenham	40·6 (*41·3°*)	55·0
Bath	40·2 (*40·6°*)	53·5†
Mean for the above stations	42·2	56·1

NOTE.—The figures in parentheses show the average temperature for the months of February, March, and April, 1882-8.

* Highest. † Lowest.

If judged by temperature alone many places on the above list would have to take a higher or lower place as winter residences for invalids than they have hitherto held in popular estimation. But one cannot judge "climate" by this simple method alone. Many persons are thoughtlessly sent away, either abroad or on sea voyages, or to some English health resort, who are far past any help change of climate can give; they start from a comfortable home full of hope soon doomed to disappointment, and their last hours, far from all their friends, are spent in bitter hopeless longing to be once more at home and there await the summons that bids them go hence. Again it is necessary in many instances for a medical man to take into consideration what I may venture to call the personal equation of his patient, whether he feels cold or heat more keenly in a bracing or in a relaxing climate.

In the above list the point that surprised me most (as it may also surprise others) was the position of Bath and Cheltenham at the bottom of the list; later on it will be seen that Bath has also the highest degree of relative humidity (86), though Cheltenham is four degrees less. These two places had always borne to me the reputation of being warm and even oppressively sultry towns. Is the explanation of this that a high degree of moisture in the air causes the sensation of cold to be less felt by some individuals in cold weather, but the sensation of heat to be more intolerable in the summer months? It is here, perhaps, that

the personal equation comes in; many people feel both cold and heat more intensely when the atmosphere is laden with moisture (irrespective of the exhilarating effects of bright sunshine). The skin is the chief organ of sensation, and it is the organ that regulates our temperature. Even as the functional powers of the heart or kidneys vary in different persons so it is probable that the skin of one individual differs from that of another; hence the various opinions that are expressed by different observers on the climate in any given locality.

It will be seen that the relative positions of the stations in Table I. bear out very fairly the popular opinion that the temperature decreases as one approaches the north or east; no less than seventeen stations (including Weston-super-Mare in the west and Margate in the extreme east) being within one degree above or below the mean temperature 42·2°), and that between the highest on the list in England (Falmouth) and the lowest (Bath) there is only a difference of 4·7°. I will now give a list of stations with their daily range of temperature calculated for the same period.

TABLE II.—*Daily range of temperature at 26 stations for the years 1882-8 inclusive.*

Ilfracombe	8·4°	Babbacombe	11·7°
Guernsey	9·1	Hastings	11·8
Falmouth	9·5	Cromer	12·0
Scarborough	10·0	Ramsgate	12·0
Llandudno	10·1	Old Street (City)	12·2
Weymouth	10·3	Southbourne	12·2
Ventnor	10·5	Teignmouth	12·4
Torquay	10·8	Bath	12·4
Margate	10·9	Regent's Park	13·8
Blackpool	11·1	Portsmouth	13·8
Weston-super-Mare	11·3	Norwood	14·0
Lowestoft	11·4	Cheltenham	15·0
Worthing	11·5	Southampton	15·5

Mean daily range for the above stations 11·6.

Again, it is strange that the last name on the list should be a town on the south coast like Southampton, where one might expect a fairly equable temperature. In this list it seems hopeless to group any districts or draw any deductions. It is surprising to find such towns as Scarborough, Ventnor, Torquay, and Margate all within a degree of each other. On the whole the difference between the highest and lowest daily range (7·1°) seems to be fairly large for so limited a space as England. According to Buchan the rate of mortality is to a large extent determined by the range of temperature. "Everywhere it is least in winter, augments rapidly in March and April, reaches the maximum in May or June, continues high during summer, and diminishes rapidly in October and November to the minimum in the winter months." It is least in wet climates, and greatest in dry and temperate climates.

Before leaving the subject of temperature I should like to be able to give the record of sunshine at all these different stations. I have found, however, that during the years referred to in this paper the records have not been sufficiently numerous or regular to give a fair estimate. I have, therefore, omitted statistics on this subject. The importance of bright sunshine to invalids cannot be over-estimated, especially when the temperature is not too low, and the winds are not cold and cutting. Many a delicate patient has received his death sentence at some of the reputed warm health resorts on the south coast, such as Hastings, Eastbourne,

Torquay, &c., by being lured by a bright and smiling sun into a deadly and depressing east wind. Perhaps in the Riviera these cases are even more frequent, for the greater reputation a place has for warmth the more careless are invalids and their attendants as regards warm clothing, and the duration of the daily airing.

The records of the winds are very difficult to make out, and when made out are not very reliable—in fact, in many cases for the purposes of comparative climatology they are absolutely misleading; in the first place, it is almost impossible to give a comprehensible estimate of the ever varying pressure, from a "calm" at three miles an hour (Beaufort scale) to a light breeze at thirteen miles, a fresh breeze at twenty-eight miles, or a moderate gale at forty miles an hour; any one of these pressures might last a minute or a dozen hours. Again, in town stations winds are deflected from their right course down streets and along promenades, trees, buildings, and elevations of ground, all helping to check their force or alter direction, so that a dozen recording instruments in as many square acres of an exposed town might all show different readings. The chief cause of our east winds in spring is the heating of the north of Africa and south of Europe, the air in these parts, expanding, flows upwards, thus setting in motion an indraught of air from the north of Russia to take its place.

The next subject of importance is the degree of moisture in the atmosphere, and this is estimated

with comparative accuracy in the calculations for rainfall and relative humidity.

TABLE III.—*Average yearly rainfall in inches, and number of rainy days at thirty-one stations for the years* 1882-8 *inclusive.*

Station.	Subsoil.	Rainfall.	Rainy days.
Margate	Chalk	22·98	165
Blackheath	Sand and gravel	23.17	152
Ramsgate	Chalk	23·34	155
Kew	——	23·43	169
Lowestoft	Gravel	24·09	173
Camden-square	——	24·64	161
Regent's Park	London clay	25·16	164
Portsmouth	Bagshot sands, London clay, &c.	26·39	173
Scarboraugh	Loam on clay	26·68	195
Old-street (City)	——	26·92	182
Worthing	Sandy loam over chalk	27·01	159
Southbourne, near Bournmouth	Sand over gravel	27·12	162
Osborne	Partly clay, partly gravel	27·33	162
Llandudno	Limestone	27·52	175
Weymouth	Sand, shingle, and clay	27·61	162
Cromer	Norwich crag and blue clay	27·73	154
Ventnor	Lower greensand	28·33	167
Cheltenham	Sandy in lower part, blue clay gravel	28·64	192
Hastings	Sand on sandstone, belt of clay inland	29·26	187
Eastbourne	West end chalk, centre and east loam	29·53	165
Southampton	Middle eocene	29·79	191
Weston-super-Mare	Mountain limestone and sand	29·81	182
Ilfracombe	Shales over sandstone	31·53	191
Bath	Upper parts oolite, lower chiefly limestone	31·71	191
Torquay	Nine-tenths on limestone	31·72	177
Teignmouth	Chiefly marl, lower parts sand	32·28	169
Blackpool	Turf, with clay below	32·95	194
Guernsey	——	33·28	192
Plymouth	Three-fourths slate, one-fourth limestone	34·04	194
Babbacombe	Limestone	35·26	190
Falmouth	Slate on quartz	43·49	204

Mean rainfall of above stations 28·79.
Mean rainy days at above stations 175.

The south-west and the west winds, laden with moisture from the Atlantic, deposit their moisture when first they meet the western shores of England;

consequently it will be seen that the western districts in the above table have the heaviest rainfall, and the towns on the east coast, generally speaking, have the least. In comparing statistics of rainfall minutely, it is important to ascertain whether the rain falls in steady, heavy showers, with long intervals between them, or whether the rain falls in a prolonged or frequently recurring drizzle. In the Riviera one gets either heavy rain or fine weather. Mr. Symons, F.R.S., gives the record for the mean rainfall for twenty-four years at Cannes, as taken by Lord Brougham, as 31·89 in., and Nice as 32·2 in. for thirty years. To show how unreliable weather statistics may be, and rainfall statistics in particular, I would note the rainfall at Lord Brougham's villa at Cannes for the years 1872 and 1875. In the former it was as much as 59·40 in., in the latter only 18·60 in. Similar extremes must frequently occur in England, and often lead people to form very erroneous opinions about any place they may be temporarily staying at. It also shows how important it is to have statistics spreading over a large number of years. Seven years is, unfortunately, the longest period we have here in England at present to calculate from, if we wish to secure scientific uniformity of instruments and accuracy in the method of calculation over this particular range of districts. This, of course, refers to other matters more than rainfall. In reference to the quantity of rain, it is important to take note of the subsoil of a district, not forgetting its degree of inclination and its power of draining away the water. It is only necessary to allude to the advantage a

light, porous soil (chalk, sand, gravel, &c.) has over a heavy and impermeable soil of clay, both as regards health and climate. The lighter soils, also, especially sand, absord and give off more heat than the heavier ones. The subject of rainfall leads naturally to the consideration of the even more important one—of the relative humidity of the atmosphere. This term is used to express the percentage of saturation of the air with aqueous vapour.

TABLE IV.—*Average relative humidity at* 26 *stations for the years* 1882-88 *inclusive,* 100 *representing complete saturation of the air.*

Old-street (City)	77	Hastings	82
Llandudno	79	Portsmouth	82
Norwood	80	Teignmouth	82
Regent's Park	80	Southbourne	82
Torquay	80	Worthing	82
Ventnor	80	Blackpool	83
Babbacombe	81	Lowestoft	83
Falmouth	81	Scarborough	83
Margate	81	Weston-super-Mare	83
Ramsgate	81	Cromer	85
Southampton	81	Guernsey	85
Weymouth	81	Ilfracombe	85
Cheltenham	82	Bath	86

Mean relative humidity for above stations, 81·8.

Again it is difficult to analyse satisfactorily the stations by any comparison or grouping of their geographical positions—e.g., Cromer and Ilfracombe, nearly at the bottom of the list, with the same degree of relative humidity. The so-called *bracing* towns being indiscriminately mixed with the towns noted for *relaxing* qualities. It is true that, omitting a nondescript station like Old-street, there is only a difference of seven degrees between the highest and lowest towns on the list.

Evaporation from the lungs and skin must necessarily be affected by the degree of moisture in the air. Chronic consumptive patients as a rule prefer a moderate degree of humidity, hot, dry air irritating the lungs and increasing cough. A cold, dry air, on the other hand, if there is no wind, is frequently borne with comfort; this is probably one of the reasons why Davos Platz and Maloja have a high reputation in many lung cases. In Dr. Tucker Wise's work on "Alpine Winter" the mean temperature for the winter months of 1884-85 is 26° F., and the dryness of the air is very much greater even than that of Egypt. At Maloja great attention has apparently been given to the warming and constant renewal of the air in the Kursaal, where patients must necessarily pass the greater part of the twenty-four hours; this important consideration is almost universally neglected in private seaside apartments, hotels, and public institutions in England and on the Continent, where everything is sacrificed for the chance of a few hours' airing in the middle of the day. Some day, perhaps, the climate of the dwelling rooms and bedrooms will receive the same attention from sanitarians as the weather does from meteorologists, an in-door climate is at least more or less controllable, whereas even a forecast does not yet seem to modify the weather. In these days of electropathic belt and similar amulets one ought to mention electricity as one of the many factors of climate, as well as the somewhat allied subject of ozone; unfortunately

at present we know next to nothing about either of them from scientific observation, though many of us, in common with the rest of the animal creation, can testify to very powerful and depressing influences acting mysteriously upon us when a thunderstorm disturbs the electrical condition of the atmosphere. I have considered it out of the province of this article to endeavour to point out the suitable climates for various diseases. Most medical men practising in health resorts must necessarily be more or less biased in favour of the virtues of their own locality, and no good end is served by special pleading or *ex-parte* statements. Distinguished specialists have written and expressed their theories and experiences on disease and its treatment at all the known health resorts; sometimes they have personal knowledge of the places, more often they have not.

The object I have in this paper is to give lists of concentrated statistics on weather in all the available English health resorts, in order that members of the profession might take them for what they are worth, and occasionally perhaps pick out some locality for special ailments, without regard to the reputation it holds in the eyes of some fashionable physician or in the eyes of the fashionable public. The general aspect of a town, and even of a single street or house, is in many instances worth a mile of statistics; no description on paper by any one man could ever satisfactorily convey to the minds of the public the aspect of a score of towns. I have purposely

refrained from singing the praises of any special locality. From the figures I have tried to place in simple uncomplicated columns it will be seen that our English climate does not, after all, differ as much as is sometimes supposed, even in the farthest separated localities. I hope that this paper may, in a small way, help to take the subject of the climate of our health resorts out of the region of mere hearsay, and enable the profession and the public to esteem at its right worth the silent but arduous labour of all those gentlemen in different parts of the kingdom, without whose unwearying industry these imperfect notes could not have been written.